

# IEEE Computer Society/Software Engineering Institute Watts S. Humphrey Software Process Achievement (SPA) Award 2016: Nationwide

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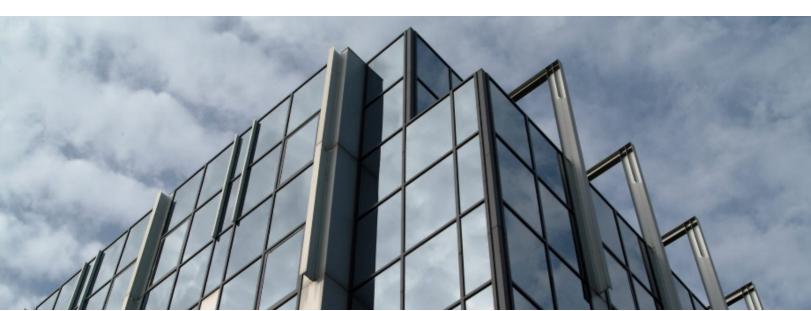
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**Software Solutions Division** 

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# **About Nationwide**

Nationwide Mutual Insurance Company is one of the largest insurance and financial services companies in the world with more than \$158 billion in statutory assets, focusing on domestic property and casualty insurance, life insurance and retirement savings, asset management, and strategic investments.

Early growth came from working together with Farm Bureaus that sponsored the company. Nine Farm Bureaus continue to promote Nationwide.

Murray D. Lincoln, the leader with the longest tenure in the company's history, had a leading role in the company's formation. The Ohio Farm Bureau Federation incorporated the Farm Bureau Mutual Automobile Insurance Company with the goal of providing quality auto insurance at low rates for farmers in Ohio in 1925. The following year the first policy was sold, and The Ohio Farm Bureau Federation was open for business.

With help from locally based sponsoring organizations, Farm Bureau Mutual begins expanding into other states. These include West Virginia, Maryland, Delaware, Vermont, and North Carolina.

From 1943 on, the Farm Bureau Mutual expanded operations until it became clear it had far outgrown its original goals—and its name. With a western expansion that included 20 additional states, the company changed its name to Nationwide Insurance.

Today Nationwide is still owned by policyholders, but it protects a lot more than just autos owned by Ohio farmers. It's a Fortune 100 company that offers a full range of insurance and financial services across the country, including car, motorcycle, boat, homeowners, pet, farm, life, and commercial insurance, as well as administrative services, annuities, mortgages, mutual funds, pensions, long-term savings plans, and specialty health services.

#### Nationwide Facts and Figures:

- #1 in total small business, pet, 457 plans, farm and ranch, and corporate life
- #2 domestic specialty (excess & surplus) commercial lines insurer
- 7<sup>th</sup> largest homeowners insurer and commercial lines insurer
- 8<sup>th</sup> largest auto insurer and life insurer
- 9<sup>th</sup> largest writer of variable annuities
- 11,000+ property and casualty agencies
- 35,000+ financial advisors
- Business in all 50 U.S. states



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# Information Technology at Nationwide

Nationwide Information Technology (IT) is comprised of seven offices representing multiple business units, internal shared services and solutions, infrastructure, operations, and governance. Nationwide IT is a team of professionals who share a passion for applying innovation and technology to help Nationwide deliver an *On Your Side* experience to every customer, every day.

Table 1: Nationwide IT at a Glance

Annual IT Spend	\$1+ Billion		
IT Workforce	9,000+ (Associate and Contract Consultant)		
Primary Operation Sites	Columbus, OH	Des Moines, IA	
	Scottsdale, AZ	Harleysville, PA	

Nationwide's ability to deliver on our promise of protecting what matters most is enabled by information technology. Nationwide IT delivers solutions to Nationwide business units by embracing the Nationwide IT strategy, shown in Figure 1.



Business leaders rely on IT for trusted advice and technology solutions that enable our business strategies.

Users love their IT solutions because we make it easier for them to do their jobs.

Business partners understand and are satisfied with the value realized from our IT investments.



We embrace our IT Delivery Model and a culture of continuous improvement in order to be a competitive IT service provider.

We aggressively manage technology to lower risk and increase business agility.

We deploy leading-edge technology in selected areas to create competitive advantage.

3.3

We are a collaborative team that attracts and retains talented IT professionals.

We are highly engaged and take pride in the solutions and services we provide.

We are a learning organization that anticipates and adapts to

changing business demands and technology trends.

Figure 1: Nationwide IT Strategy

# **Abstract**

For nearly 10 years Nationwide IT has been on a software process improvement journey in pursuit of increased quality, productivity, and predictability. By deploying and scaling a blend of Agile and Lean concepts and a unique team model, as well as fostering a problem solving and learning culture, Nationwide IT has produced significant business outcomes and demonstrated increasing employee engagement. These achievements have positioned Nationwide IT to scale Agile to an enterprise level. In 2016 the Carnegie Mellon University Software Engineering Institute and IEEE recognized Nationwide IT with the Watts Humphrey Software Process Achievement Award. For more information on the SPA Award, visit http://www.computer.org/portal/web/awards/technical.

# 1 Business Imperatives

### 1.1 Deliver the Right Work

Deliver the right work means prioritizing and delivering projects, applications, and infrastructure to enable what is most important to Nationwide's business. In partnership with business, new projects are evaluated for strategic alignment, business value, and our ability to deliver. By ensuring that we are working on the right things at the right time, we are better able to manage demand, and predict project success.

#### **Strategic Aspirations**

- Business leaders rely on IT for trusted advice and technology solutions that enable our business strategies.
- Users love their IT solutions because we make it easier for them to do their jobs.
- Business partners understand and are satisfied with the value realized from our IT investments.

# 1.2 Deliver the Right Way

Deliver the right way means standardizing and driving efficiencies by maturing roles, processes and tools and by sharing common services and resources across Nationwide IT. This is about making sure we are a competitive IT operation. A key focus area is creating IT capability that continuously matures to get better, faster, and cheaper at providing quality technology solutions to Nationwide.

#### **Strategic Aspirations**

- We embrace our IT Delivery Model and a culture of continuous improvement in order to be a competitive IT service provider.
- We aggressively manage technology to reduce risk and increase business agility.
- We deploy leading-edge technology in selected areas to create competitive advantage.

# 1.3 Deliver with an Engaged Workforce

Nationwide IT achieves our strategy with an engaged workforce that is highly skilled, highly motivated, and acts in the best interests of our customers and the company at all times. Nationwide IT associates bring the knowledge, experience, and passion needed to deliver our IT strategy and ultimately the Nationwide strategy.

#### **Strategic Aspirations**

- We are a collaborative team that attracts and retains talented IT professionals.
- We are highly engaged and take pride in the solutions and services we provide.
- We are a learning organization that anticipates and adapts to changing business demands and technology trends.

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# 2 Challenges and Opportunities

The Nationwide business consists of a variety of affiliated companies focusing on domestic property and casualty insurance, life insurance and retirement savings, asset management, and strategic investments. Prior to 2008 software development capability was organized in a largely federated model with disparate software development operations reporting into one of over 20 different business unit leaders.

In this model Nationwide benefited from deep business partner relationships and strong domain knowledge within IT. Software specialists developed breadth and depth in software systems within a business unit and truly became application experts.

# 2.1 Responding to Demand

The diversity of Nationwide businesses and the industry environment create a complex portfolio of software build projects to deliver each year. While enterprise software build investment remained relatively steady year over year, individual business unit software build investment varies greatly depending on industry trends and Nationwide strategy.

Within software development the organizational boundaries and workforce structure did not provide the necessary flexibility to meet the year to year demand fluctuation within a business unit. Workforce inefficiencies and reliance on contract staff were not uncommon.

Establishing and maintaining high performing software teams and reaping the benefits of a continuous improvement culture was fleeting due to a "bring people to the work" approach to staffing. Software and project specialists were staffed to fill roles on a project by project basis—the concept of a team was only temporary nature.

# 2.2 Standards and Capabilities

As software development and delivery in each business unit operated independently, the way work was performed likewise evolved independently. Project management, process management, and software engineering practices varied greatly from one business unit to the next. As a result, predictability, quality, and productivity were inconsistent across the enterprise portfolio.

New methods emerging in the industry were adopted on individual change curves. As Agile practices entered Nationwide, business units were taking divergent paths—optimizing within an area rather than optimizing the whole.

# 2.3 Information Technology Cost

With the increasingly commoditized product market in the insurance industry, insurance providers compete largely on price. Like any other business, technology investment at Nationwide is a component of the cost of providing service to consumers. The operating model and capability levels, combined with an aging and complex application portfolio, put Nationwide IT in an unfavorable cost posture. Benchmarking activities would lead to the realization that the services provided by

Nationwide IT were more expensive relative to industry peers and service providers. To remain competitive Nationwide needed information technology to cost less.

#### 2.4 Centralized Services

In 2008 all software development capabilities began operating under the office of the chief information officer (CIO) while continuing to serve each business unit. IT leaders wished to maintain the strong business relationships and subject matter expertise within the business units as well as drive enterprise efficiencies and standards. An internal service provider construct began to emerge within Nationwide IT.

With the goals of driving down expenses, increasing quality, and harnessing a more efficient model for building software, senior leaders began to lay ground work to build a standardized software development system within the IT delivery model that all business units could leverage for delivery.

### 3 The Team Model

In alignment with strategy, the success of Nationwide IT as a service provider depends on developing a primarily in-house IT capability. As a mutual company Nationwide has a bias for investing in talent located in the communities where we live and operate. To attract, grow, and retain talent and to increase the flexibility of staffing a unique organizational model and team structure was built around the concept of "standing teams."

# 3.1 The Standing Team

The standing team concept has improved collaboration between project teams, other application teams, and our business partners. Mimicking common Scrum framework roles, a standing team is comprised of specialists in analysis, programming, and testing as well as a business product owner. Four competency leader positions are at the core of the standing team—ScrumMaster, Requirements Leader, Technical Leader, and Testing Leader. This core remains together as new projects are brought to the standing team, rather than building teams around projects. This model allows us to build teamwork, reinforce best practices and eliminate the waste associated with startup and tear-down that is typically incurred in traditional projects.

Self-organization and team-empowerment are encouraged in the standing team model. Reporting relationships do not exist within the standing team and reporting managers do not direct the day-to-day work. Both full time employees and contract employees may be matrixed into the team from various IT areas to create a strong mix of technical, system, and method knowledge on the team. Team members learn each other's working styles and personalities—and begin to truly operate as a high-performing team. Poly-skilling across team roles is encouraged on teams, so any willing team member may contribute to any aspect of the work for the good of the team.

A strong bias exists for standing teams to be assigned work that allows for singular focus and shared goals to avoid context switching and churn. This allows every member of the team to have a common understanding of what success means for their team and what they need to do to enable that success. Work brought to the team is a "whole team" effort where all people on the team are needed and they contribute any way they can to reach a common goal. The standing team is accountable for the delivery of work rather than individuals.

#### 3.2 Practitioners as Coaches

The standing team model puts elevated expectations on those staffed in the four competency leader positions to drive capability and delivery. Competency leader roles are staffed with a focus on technical expertise and practice excellence over system or business expertise.

Each competency leader thus also has a role as a coach responsible for delivery of the work as well as leading the team to deliver work the right way. In their coaching role, the competency leader serves as the leader of their associated domain within the team, the face of the domain outside the team, and as capability coach of the practices and mindset expected on the team.

# 4 The Way We Work

With a focus on the strategic initiative to deliver the right way, leaders aspired to rethink the design, develop, integrate, and testing phase (DDIT) of software development. Across Nationwide IT there were pockets of teams exploring emerging trends such as Agile methods, but there was little consistency in approach. To help shape the direction of a standardized software development system, leaders brought together early adopter teams to identify the methods and values that enabled success. These visionary teams defined the principal values that guide the way we work today, known as the "21 Tea Leaves."

#### 4.1 21 Tea Leaves

The 21 Tea Leaves, listed in Table 2, introduced a radically different paradigm for software development than was the enterprise norm at the time. Borrowing elements from the mindset of Agile, Scrum management practices, extreme programming (XP) engineering practices, and Lean concepts, the 21 Tea Leaves model the behaviors we aspire to demonstrate on all standing teams.

Table 2: 21 Tea Leaves of Software Development

Whole Team	Simple and Evolutionary Design	Sustainable Pace	
Open Workspace	Test Driven Development	Iterations	
Daily Stand-Up Meetings	Refactoring	Iteration Planning Meetings	
Big Visible Charts	Continuous Integration	Show and Tells	
Retrospectives	Automated Regression Tests	Frequent Releases	
Customer Collaboration	Technical Debt	Release Planning Meetings	
Collective Code Ownership	Pair Programming	Story Cards with Acceptance Criteria	

#### 4.2 Standard Work

To build a standardized software development system scalable across business units the 21 Tea Leaves were integrated into a capability model for software development, shown in Figure 2. Known as Standard Work, this collection of processes, guidelines, and templates serves to institutionalize the 21 Tea Leaves by leveraging the Capability Maturity Model Integration (CMMI) for Development framework. Standing teams leverage Standard Work to guide delivery and improvement efforts in their day-to-day work.

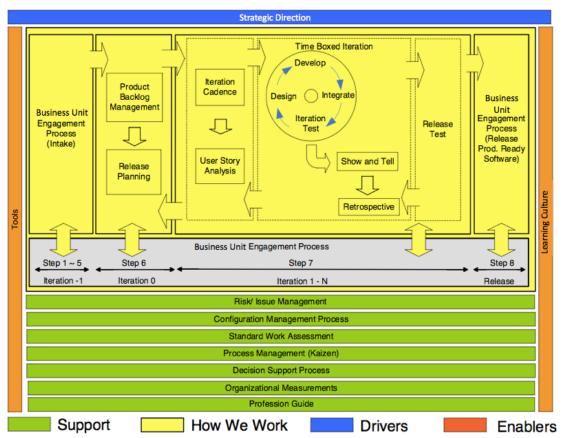


Figure 2: Software Development Capability Model

To support standing teams in this capability model, a strong focus on servant leadership and lean management is expected in operations, people leadership, and delivery leadership. The behaviors expected from leaders is institutionalized through the concept of Leader Standard Work.

### 4.3 Continuous Improvement

Continuous Improvement is a pillar of the Nationwide IT culture and is implemented through the A3 problem solving method at the team level. The A3 method supports solving problems, gaining consensus, and developing employees and enforces "plan do, check, adjust" thinking. Changes to Standard Work, environmental, operational improvements, and other employee ideas are funneled through the Continuous Improvement (CI) program and rolled out to the organization upon completion. CI teams meet weekly to review newly submitted items and share status updates on the progress of their problem-solving efforts. CI teams read out their recommendations to leadership and change champions for feedback and deployment on a regular cadence.

Notable CIs that have been widely adopted with measurable success include the implementation of Acceptance Test Driven Development (ATTD) and the addition of risk-based contingency funding in Risk Management practice.

# 5 The Lean System

Nationwide IT has implemented a variety of Lean concepts into the system—from the work environment to the way that leaders support the delivery. Integrating the work environment, the process, and the support system allows for a focus on value delivery, problem-solving, and employee engagement.

#### 5.1 The Work Environment

Standing teams rely on personal interactions and frequent and open communication to collaborate on work. The software development work environment supports these behaviors with ergonomically designed and open team spaces. Workstations include dual-screen monitors, moveable furniture components, and rolling whiteboards that teams can adjust depending on the needs of the team. Team members can choose their own seats and can easily move within the team space or to different team spaces based on who they are working with.

We're more agile as a business and more responsive to our customers. Collaboration has become an expected part of our culture and is built into our office space and practices.

Steve Farley, Vice President, Software Development Services
[Nationwide 2017]

Teams are encouraged to hold meetings and interact with business partners in the team space. Audio-visual equipment is available for each team space to allow for software demonstrations, feature reviews, and virtual conferencing without leaving the team space—reducing time and effort on people movement and facility reservations.

# 5.2 Big Visible Charts

Standing teams use "big visible charts" in the team space to guide day-to-day work. A variety of low-tech colored indicators and workflow visuals are used in real time and on a regular cadence to visualize key performance indicators (KPI) that help the team deliver.

During each cycle the team collects and displays performance data for real-time decision making and input to regular retrospective sessions, as enumerated in Table 3. In retrospectives, the team analyzes various measures for areas of strength or opportunity. Identified items are added to the team backlog and prioritized for problem solving in future cycles of work.

If the team believes an improvement can benefit others they are encouraged to submit the idea into the organizational CI program to be further refined and made available to other standing teams.

#### 5.3 Real-Time Information

Visual management using big visible charts has proven to be a powerful tool in Nationwide IT for both front-line workers as well as leadership. The goal of visual management is to create a picture of actual outcomes compared to expected outcomes in real-time to foster problem solving. While both trailing or real-time information may be readily available in a system, spreadsheet, or report, the use of big visible charts makes the information apparent and unavoidable in the work environment leading to timely problem solving and ease of escalation.

Table 3: Standing Team Measures

Team Capacity	Automated and Manual Test Scripts		
Velocity (Points)	Continuous Integration Reports		
Budget	Code Coverage Reports		
Blockers	Lines of Code		
Errors	Risk and Issues		
Defects	Team Staff Mix		
Hours of Effort	Team Role Ratios		

Teams rely on their charts to communicate within the team and to the stakeholders they rely on for input and support. Visuals serve as a common language for teams and leaders to understand current state and know when support is needed simply by being in the environment.

The culture we are trying to build is one of transparency, collaboration, and problem solving, rather than hiding issues or trying to look good at all costs. We are not perfect, of course, but we strive to continuously improve our system by reflecting and learning from mistakes. Visual management is critical to getting there, and it is an expression of our new way of thinking.

Guru Vasudeva, CIO, Program and Application Services [Lean 2017]

#### 5.4 Leaders as Coaches

Leaders at all levels of the organization follow Leader Standard Work and manage delivery operations using big visible charts. KPIs, blockers, risks, and other operational data flow from the front-line in aggregate through the visual management system. This flow of information is supported by a cadence of huddles involving frontline workers and leaders at each level. Support for issues at the frontline are easily escalated to the appropriate level for problem solving.

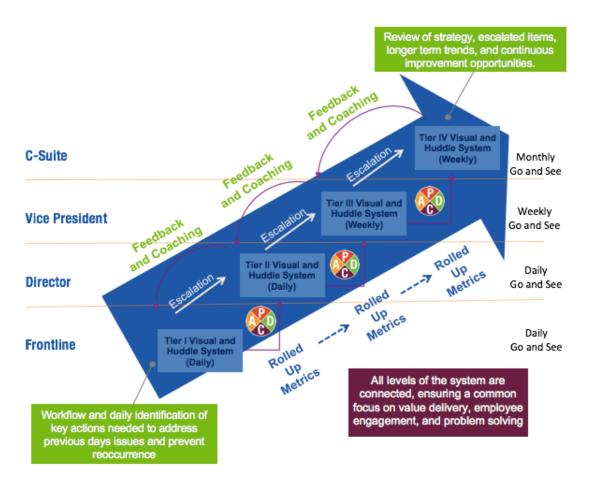


Figure 3: Real-Time Management

In the system leaders are expected to demonstrate a "go and see" style of management. Leaders regularly go where the work is done to observe and identify coaching opportunities. Respect for people and developing others are key objectives for people leaders and delivery leaders in the system.

Above all else, the job of a lean leader is to coach people.

[Lean 2015]

# 6 Developing Skill and Mindset

In alignment with strategy, Nationwide IT engages our workforce in a culture of continuous learning to develop strong talent and to adapt in an ever-evolving technology and business landscape. A unique blend of coaching and training has been developed to foster learning opportunities.

# 6.1 A Learning Culture

Nationwide IT strives to ensure every associate can on-board quickly and, more importantly, has opportunity to improve their skills throughout their career.

At the core of our learning culture is the 70-20-10 adult learning model. The 70 percent of learning occurs in the work through practices such as peer review and pair programing. An additional 20 percent comes from coaching provided by the embedded practitioner coaches. The final 10 percent of the model is our ability to deliver training using an approach that is targeted at new talent or customized to the specific needs of the project. Nationwide IT has invested heavily in customized training covering culture, work management, and software engineering across the competencies of the standing team model, as described in Table 4.

Table 4: Software Development Foundational Training

Culture	Management Practices	Engineering Practices
Agile Mindset	Agile Hands-On Workshop	Test-Driven Development and Unit Testing
The Experience (cultural immersion)	Agile Story Writing Workshop	Making Your Code Agile
Standard Work Awareness	Product Owner Workshop	Ruby and Cucumber Workshop
Coaching Workshop	Backlog Management	Gherkin Workshop
A3 Workshop	Nationwide Agile Practices	Pair Programming Workshop

#### 6.2 Career Development

Nationwide IT depends on various talent pipelines including entry-level hires, experienced professionals, and contract consultants. As new individuals are deployed they are assigned an on-boarding checklist which outlines tasks and training items to complete specific to their role with timelines for expected completion. Existing employees are also assigned new items as training needs arise.

These techniques make sure that new and existing staff have the necessary skills to do their job, continuously improve on existing skills, and continue to gain new skills to keep pace with the technology marketplace. The integrated experiential learning, poly-skilling, coaching, and training has enabled Nationwide IT to scale subject-matter expertise and flex with changing needs.

The software development system enriches the career paths of employees by allowing both technical and non-technical roles greater mobility across technologies, business units, and standing

teams. While system and business domain expertise remains critical to delivery, associates can also focus on building expertise in technology and methods as well. Defined paths through a craftsmanship program have been developed for engineers to transition from one technology to another—providing new opportunities for career growth and helping the Nationwide IT workforce transition from legacy technology.

### 6.3 Peer-Based Learning

A peer-based learning program known as "Teaching Thursdays" has emerged to enable just-intime specialized training. It serves as a key driver of the Nationwide IT learning culture. Teaching Thursdays offer IT associates the opportunity to share knowledge, improve their skills, and teach one another through a standard two hours of learning time on the first and third Thursday of each month.

Monthly, both practitioners and leaders participate in Teaching Thursdays to learn. Those with a passion for teaching develop and present on various topics relevant to Nationwide IT. All associates are welcome to participate in sessions, which are first come, first served. Learning topics are identified and led primarily by associates with support from leadership.

Learning materials and other content developed for Teaching Thursdays are stored in an enterprise repository for reuse. Select sessions are recorded live for later consumption.

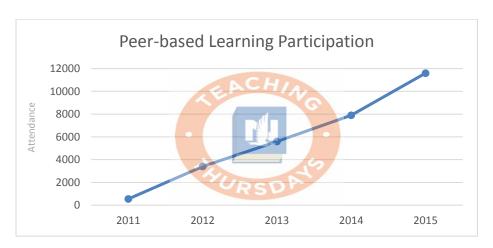


Figure 4: Peer-Based Learning Growth

Started as an experiment in 2011, the program attracted just over 500 participants. As a completely voluntary activity for IT associates, the program grew to bolster more than 10,000 participants yearly by 2015. Recent performance indicators based on feedback from participants put learning effectiveness ratings near 90 percent for the program.

#### 6.4 Nationwide IT Technical Conference

In 2010, Nationwide founded its own technical conference—a one-day event modeled after technology industry conferences tailored for Nationwide IT. "TechCon," as it is known today, provides a platform for sharing ideas and skills focusing on Application Development, Agile Methodology and Best Practices, DevOps, Analysis and Testing, Architecture, Project Management,

and Leadership. IT leaders and frontline employees plan and host TechCon at the Greater Columbus Convention Center in Columbus, Ohio.

Industry thought leaders are hand selected each year as keynote speakers for TechCon in alignment with important themes and trends emerging within the enterprise. Nationwide IT practitioners, leaders, and strategic partners lead break out session topics.

The first TechCon focused mainly on application development topics with roughly 200 attendees. Today, TechCon has expanded across all Nationwide IT domains and is open to all employees and our contract consultants. Since 2015 Nationwide TechCon has hosted more than 1,500 attendees annually.

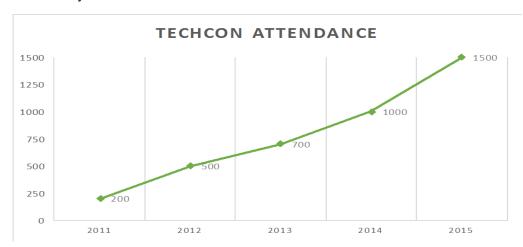


Figure 5: Technical Conference Growth

#### 6.5 Industry Collaboration

Nationwide IT culture includes a bias for learning and sharing our journey. This is demonstrated regularly both within the walls of Nationwide and throughout the industry. Yearly, leaders and practitioners commit to sharing experiences through speaking engagements with industry groups, universities, and at regional and national conferences.

One of the best ways we have learned to share is to immerse people in our work environment and show how we work. The integrated nature of the work environment, the process, and the support system provide a great opportunity for guests to "go and see" how the work is done. In the last two years alone we have opened our doors to more than 50 companies and other organizations to share and learn.

### 7 Evolution and Results

Early success with the standardized software development system provided the catalyst to scale. In 2012 expansion reached a growth rate of over 25 percent of software build per year. By the close of 2015 this new way of working had spread to over 200 standing teams through a combination of departmental growth, transformational efforts, and natural adoption. At this number, software at Nationwide is delivered primarily through use of the standing team model, standard work, and the Lean system.

### 7.1 Growth and Adoption

Starting as six standing teams in a Dublin, Ohio office location, the standardized software development system showed positive results in speed to delivery and increased customer satisfaction. As the system began to expand, standing teams were relocated to Nationwide's headquarters in downtown Columbus, Ohio.

In 2011 the system began expanding to Des Moines, Iowa—Nationwide's second largest office location. Two years later Scottsdale, Arizona became the third location for system expansion. In 2015 the system was introduced in Nationwide's Harleysville, Pennsylvania location.

2015 growth and adoption results:

- growth from 6 to 200 standing teams enterprise-wide
- Lean system deployed to 50 percent of software delivery
- visual management deployed to 75 percent of software delivery

### 7.2 Productivity

Using the QSM SLIM-Metrics product suite Nationwide measures the productivity of the DDIT phase of software development compared to industry averages. Nationwide uses this tool to benchmark against industry reference trends from the QSM database of over 10,000 complete software projects.

Three inputs are used to measure DDIT:

- lines of code
- duration
- cost (hours)

Size-adjusted Productivity Index (PI) is calculated as the average deviation from the QSM Business Financial trends. A positive size-adjusted PI value reflects a higher-than-industry average. In Figure 6 below, zero (0.00) represents industry average and shows the positive productivity trend for Nationwide IT software releases. Eighty-two percent of Nationwide's standing teams perform in QSM's top two quartiles.

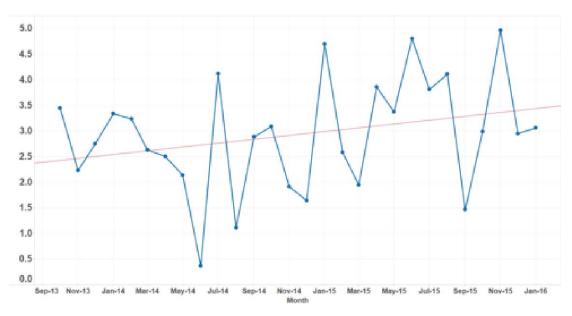


Figure 6: Delivery Productivity

In alignment with what Nationwide has learned with QSM SLIM-Metrics, Gartner Benchmarking engagements have further validated that the system performs favorably in terms of productivity and unit cost among industry peers as well as traditional software development methods used inside the company.

# 7.3 Predictability

Nationwide began measuring predictability of standing team sprints by analyzing committed points per sprint by completed points per sprint. Over the last several years, standing team predictability has improved and stabilized—closing in on the +/- 20 percent of committed points being completed per iteration, shown in Figure 7. The improved consistency of planning on two-week cycles has contributed to an increase of on-time delivery of projects from 60 percent to over 90 percent since 2009.

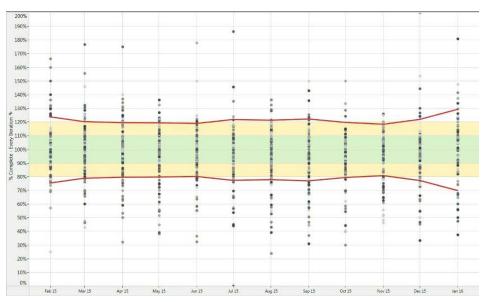


Figure 7: Delivery Predictability

# 7.4 Quality

Focus on engineering practices such as pair programming, test-driven development, and test automation has led Nationwide IT to dramatic results in quality. At an enterprise level, engineering focus has had a significant impact to the overall quality of Nationwide's releases.

In a three-year period the enterprise experienced an 80 percent reduction in critical defects and an 86 percent reduction in high defects while Agile and Lean concepts expanded across development operations. Critical defect improvements can be seen below in Figure 8.

An industry peer benchmarking engagement in the same period produced a defect injection rate of 10 defects per thousand function points (KFP) for the system. These results show performance well above traditional approaches in the company and position Nationwide IT favorably compared to the industry peer average of 160 defects per KFP. The defect rate of the system is well above the 25th percentile in industry—a level of performance our benchmarking partner describes as world class.

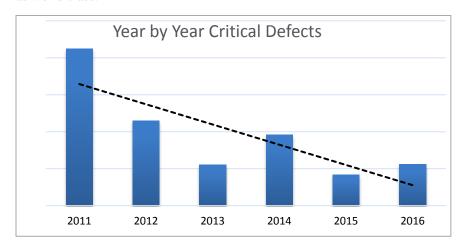


Figure 8: Critical Defect Reduction

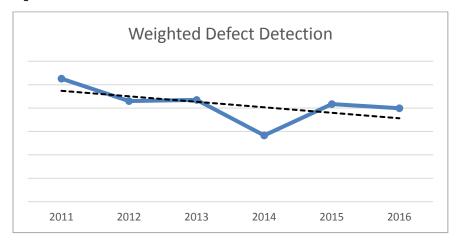


Figure 9: Weighted Defect Detection

### 7.5 Benchmarking

Nationwide IT seeks to evaluate performance against industry peer groups and appraise maturity based on industry standards. On a regular cadence the organization engages with a leading technology research and advisory partner for benchmarking services and with CMMI Lead Appraiser partners for appraisal services. Strategic recommendations, an industry performance profile, and areas of opportunities are funneled as priorities into the appropriate level of problem solving from executive level through frontline teams.

Table 5: Nationwide IT Benchmarking Activity

Year	Activity	Outcome
2010	CMMI-DEV SCAMPI A: Maturity Level 3	CMMI-DEV: Maturity Level 3 rating Recommendations for improvement and high maturity
2011	Industry Peer Benchmarking Engagement	Performance profile in industry Strategic recommendations
2011	CMMI-DEV Maturity Level 3 Gap Analysis	Recommendations for improvement and high maturity
2012	CMMI-DEV Maturity Level 3 Gap Analysis	Recommendations for improvement and high maturity
2013	CMMI-DEV SCAMPI A: Maturity Level 3	CMMI-DEV: Maturity Level 3 rating Recommendations for improvement and high maturity
2014	Industry Peer Benchmarking Engagement	Performance profile in industry Strategic recommendations
2014	CMMI-DEV Maturity Level 3 Gap Analysis	Recommendations for improvement and high maturity
2015	CMMI-DEV Maturity Level 3 Gap Analysis	Recommendations for improvement and high maturity

# 7.6 Workplace and Engagement

At Nationwide, an engaged associate is involved in, enthusiastic about, and committed to his or her work. Engagement is much more than an annual survey or creating an action plan. It's about our behaviors, daily interactions and work environment.

All associates play an important role in creating a great work environment where we're able to make a real impact for the good of our members, our communities, and each other.

Successful organizations have people who feel like they belong to the mission and purpose of the organization. At Nationwide, there are many ways people feel like they belong, including working together to serve our members; contributing to our communities;... and supporting and collaborating with each other. Engagement is the culmination of that process. I don't view engagement as only a score.

Steve Rasmussen, Nationwide CEO [Gallup 2017a]

Nationwide leverages a performance management consulting partner to measure engagement—focusing on basic needs, leader support, teamwork and growth.

During periods of significant transformation within Nationwide IT, the enterprise has demonstrated increasing levels of employee engagement, as shown in Figure 10. The standardized software development system developed by Nationwide IT elevates value delivery, problem-solving, and employee engagement. Frontline workers are empowered within their team and in their ability to improve the system. A leadership focus on people development and support in problem-solving enables individual and team success.

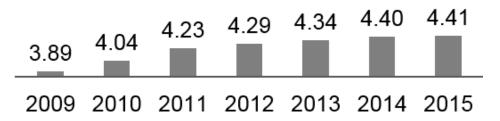


Figure 10: Nationwide IT Engagement Scores

Nationwide has received a variety of workplace and engagement awards in industry during the same period of change—highlighting Nationwide's focus on being a world class place to work for technology professionals and others.

Table 6: Industry Recognition - Workplace and Engagement

Award	Year
Gallup Inc Great Place to Work [Gallup 2017b]	2012
Gallup Inc. – Great Place to Work  Computerworld – Best Places to work in IT [Computerworld 2017]	2013
Gallup Inc. – Great Place to Work Computerworld – Best Places to work in IT	2014
Gallup Inc. – Great Place to Work Computerworld – Best Places to work in IT Fortune's 100 Best Companies to Work for® 2015 [Fortune 2015]	2015
Gallup Inc. – Great Place to Work Computerworld – Best Places to work in IT Fortune's 100 Best Companies to Work for® 2016 [Fortune 2016]	2016
Great Place to Work® Institute – Great Place To Work – Certified 2016 [Great 2016]	

#### 7.7 A Vision for 2020

As Nationwide's diverse portfolio of businesses continue to evolve, the Nationwide IT software improvement journey continues to align strategic initiatives to meet the needs of the business. At present numerous transformational efforts are underway in the enterprise. This work will modernize and simplify Nationwide's IT system portfolio through investment in package and as-a-service applications and revolutionize the IT delivery model by developing our workforce, building new capabilities, and optimizing how we deliver and operate. Many of the transformational initiatives are rooted in a commitment to build on the successes of the journey thus far.

Nationwide IT will continue to invest in developing skills and mindset in our workforce by actively planning for future needs, attracting and retaining talent, and preparing employees for emerging technology and methods.

The standardized software development system will be scaled to an enterprise level. All software will be delivered using the unique blend of Agile and Lean concepts and the standing team model. A new enterprise methodology will institutionalize Standard Work and provide a foundation to further develop capabilities in areas such as test automation and continuous delivery.

#### References

URLs are valid as of the publication date of this document.

#### [Computerworld 2017]

Best Places to Work in IT: Search the archives 1994-2016. *Computerworld*. Jan. 12, 2017 [accessed]. http://www.computerworld.com/article/3073562/bestplaces2016/best-places-to-work-in-it-search-the-archives-1994-2016.html

#### [Fortune 2015]

100 Best Companies to Work For 2015. *Fortune*. Jan. 6, 2017 [accessed]. http://fortune.com/best-companies/2015/

#### [Fortune 2016]

100 Best Companies to Work For 2016. *Fortune*. Jan. 12, 2017 [accessed]. http://fortune.com/best-companies/2016/

#### [Gallup 2017a]

Your Employees Are Either Patriots or Mercenaries. *Gallup*. Jan. 6, 2017 [accessed]. http://www.gallup.com/businessjournal/157676/employees-either-patriots-mercenaries.aspx

### [Gallup 2017b]

Current and Previous Gallup Great Workplace Award Winners. *Gallup*. Jan. 12, 2017 [accessed]. http://www.gallup.com/events/178865/gallup-great-workplace-award-current-previous-winners.aspx

#### [Great 2016]

Nationwide. Great Place to Work. 2016. http://reviews.greatplacetowork.com/nationwide

#### [Lean 2017]

People Development: Lean Insurance for Nationwide. *Planet Lean*. Jan. 16, 2017 [accessed]. http://planet-lean.com/lean-it-at-nationwide-developing-9000-people

#### [Lean 2015]

Orzen, Michael A. & Paider, Thomas A. *The Lean IT Field Guide: A Roadmap for Your Transformation*. Productivity Press. 2015. ISBN 978-1498730389.

https://www.crcpress.com/The-Lean-IT-Field-Guide-A-Roadmap-for-Your-

Transformation/Orzen-Paider/p/book/9781498730389h

#### [Nationwide 2017]

Nationwide embraces DevOps and improves software quality by 50 percent. *IBM*. Jan. 6, 2017 [accessed]. http://www-03.ibm.com/software/businesscasestudies/bd/en/corp?syn-key=G512504W24415M17

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